

A.1.6 HIGH ENERGY ASTROPHYSICS

1. Scope of Program

1.1 Overview

This program element solicits investigations for basic research relevant to the NASA High Energy Astrophysics (HEA) Supporting Research and Technology (SR&T) program that includes the fields of x-ray and gamma-ray astronomy and particle astrophysics. Its primary goal is to obtain a better understanding of astrophysical objects (excluding the Sun) and phenomena as revealed through their high-energy radiation characteristics.

Note that investigations relevant to the HEA program that fall into the following categories are not within the scope of this HEA SR&T solicitation but may be proposed in response to solicitations in other program elements of this NRA:

- (1) Theoretical investigations are solicited separately under the Astrophysical Theory Program discussed in Section A.1.4 of this Appendix;
- (2) Projects directed mainly toward the analysis of archival data are solicited under the Astrophysics Data Analysis program discussed in Section A.1.2 of this Appendix; and
- (3) Proposals for laboratory astrophysics are solicited under the Space Astrophysics Research and Analysis (SARA) program described in Section A.1.5 of this Appendix.

1.2. X-Ray and Gamma Ray Astronomy

The purpose of the x-ray and gamma-ray astronomy SR&T program is to provide support for NASA's space flight programs in these disciplines. In the context of this program, x-rays are defined as photons in the approximate energy range 0.1 - 30 keV, while gamma-rays are defined to lie in the energy range 30 keV - 200 GeV. This program element provides support for basic research relevant to the design and development of instrumental concepts for future x-ray and gamma-ray astronomy missions and for the conduct of scientific investigations via exposure of instrumentation carried on sounding rockets and high altitude balloons. Proposed research may include ground-based observations of phenomena defined primarily by their high-energy characteristics, provided that such studies pertain directly to NASA HEA space missions. Note that proposers for a multiple-institution development of new rocket or balloon payload may wish to consider the special provisions for consortium proposals in Subsection 2.2 of this program element below.

1.3. Particle Astrophysics

The particle astrophysics element supports experimental studies related to understanding the origin, acceleration, and transport of galactic cosmic rays. Fundamental measurements include the elemental abundance, isotopic composition, and energy spectra of galactic cosmic rays, as well as antimatter, exotic particles, and dark matter to provide tests of theoretical models. This experimental program primarily supports science investigations utilizing large stratospheric balloons to carry instruments above about 99% of the Earth's atmosphere. The payloads funded over the past decade have been similar in many respects (e.g., level of technological sophistication, management approach, etc.) to space flight instruments for focused science investigations. It should be noted that this program element does not support ground-based observations. It may, however, support exploration and demonstration of new space-based instrument concepts pertinent to the science goals of the discipline.

All projects selected for this discipline must demonstrate high scientific merit and a credible plan for project completion, including any anticipated balloon flight requirements to carry out the project. The annual funding needs, the total project cost, the performance on recent, prior investigations (if applicable), and the extent to which an investigation contributes to the discipline's technological capability will be major factors in continuing multiple year projects and in selecting new investigations. The total out-year commitments, even though they are only tentative, must still allow for a stimulating future program of new investigations within the overall budget constraints. Based on past experience, at most one major, new balloon mission is likely to be selected every three years, but less expensive projects could be selected with greater frequency. Although most awards are for three years duration, in rare cases a five year proposal may be accepted to develop a completely new, highly meritorious mission through its first flight.

Note that proposers for a multiple-institution development of a new balloon payload may wish to consider the special provisions for consortium proposals in Subsection 2.2 of this program element below.

2. Programmatic Information

2.1 General Information

Approximately one-third of the annual HEA SR&T program budget will be available for competition through this ROSS 2002 NRA for initiating new three year projects (including renewals) in FY 2003. It is anticipated that roughly \$6M will be available in FY 2003, with similar amounts available in succeeding years.

IMPORTANT INFORMATION

As discussed in the *Summary of Solicitation* of this NRA, the Office of Space Science (OSS) is now using a single, unified set of instructions for the submission of proposals. This material is contained in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement – 2001* (or *NASA Guidebook for Proposers* for short) that is accessible by opening URL <http://research.hq.nasa.gov>, and linking through the menu item "Helpful References," or may be directly accessed online at URL <http://www.hq.nasa.gov/office/procurement/nraguidebook/>. This NRA's Summary of Solicitation also contains the schedule and instructions for the electronic submission of a *Notice of Intent* (NOI) to propose and a proposal's *Cover Page/Proposal Summary*, which now also includes the required *Budget Summary*, and the mailing address for the submission of a proposal.

Note that because of the greater degree of complexity of experimental project proposals for this program element, the Science/Technical/Management section of such proposals may be 20 pages long, instead of the default 15 pages specified in the *NASA Guidebook for Proposers*.

Questions about x-ray and gamma-ray astronomy should be addressed to:

Dr. Louis J. Kaluzienski
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E-mail: lkaluzie@hq.nasa.gov

and questions concerning particle astrophysics should be addressed to:

Dr. W. Vernon Jones
Telephone: 202-358-0885
E-mail: wvjones@hq.nasa.gov

both of whom have the common mailing address:

Astronomy and Physics Division
Code SZ
Office of Space Science
NASA Headquarters
Washington, DC 20546

2.2 Special Instructions for Multi-Institutional Proposals

Proposals to this program often involve the development of payloads that require collaboration among several institutions. In such cases, the lead PI may propose a direct subcontracting arrangement between the PI institution and the Co-I institutions. In some cases it may be more appropriate for NASA to provide separate awards to each institution involved in such multiple institutional investigations, with an investigator from each Co-Investigator institution serving as the Institutional PI for the award to that institution. The following applies to proposals involving such separately funded contributions from multiple institutions.

- Only the primary proposal for the overall investigation, submitted by the single Principal Investigator, will be reviewed. This primary proposal must include the PI's work statement and budget, plus appended task statements and budgets from all other collaborating Co-I institutions. The Cover Page of the primary proposal must show separately the dollar amounts requested by the leading institution and each Co-I institution, plus the yearly total requests for the total investigation.
- The appended task statement(s) from Co-I collaborating institution(s), not to exceed five pages, must describe that institution's contribution to the investigation, the roles of the Co-I(s) at that institution (if more than one, a single investigator to serve as the Institutional PI for that institution must be identified), and a Budget Summary for the task following the formats specified in the *NASA Guidebook for Proposers*.
- Each Co-I institution must additionally submit a formal, signed proposal incorporating the task statement noted above, all prefatory materials indicated in the *NASA Guidebook for Proposers*, and a full institutional budget. Such Co-I proposals must be clearly cross-referenced on the *Cover Page* to the lead PI proposal and must have the same title as the PI proposal.